

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) An assembly comprising:

a first pump/motor having a first drive plate assembly rigidly coupled to a shaft, the first drive plate assembly being in hard contact with a first end surface of the shaft in a plane perpendicular to a longitudinal axis of the shaft; and

a second pump/motor having a second drive plate assembly rigidly coupled to the shaft and in hard contact with a second end surface of the shaft in a plane perpendicular to the longitudinal axis of the shaft, the first and second drive plate assemblies and shaft acting as a substantially solid element when under compression to cancel axial loads generated by the first and second pump/motors through the shaft.

2. (Original) The assembly according to claim 1 wherein the first drive plate assembly has a first drive plate, an inner surface of the first drive plate being in hard contact with the first end surface of the shaft, and the second drive plate assembly has a second drive plate, an inner surface of the second drive plate being in hard contact with the second end surface of the shaft.

3. (Original) The assembly according to claim 1 wherein the first drive plate assembly includes a first pump/motor shaft having a first annular surface in a plane perpendicular to the longitudinal axis of the shaft and the second drive plate assembly includes a second pump/motor shaft having a second annular surface in a plane perpendicular to the longitudinal axis of the shaft, and the first and second pump/motor shafts are rigidly connected to the shaft such that the first annular surface is in hard contact with the first end surface of the shaft and the second annular surface is in hard contact with the second end surface of the shaft.

4. (Original) The assembly according to claim 1, further comprising a first gap provided between the first drive plate assembly and a first annular bearing provided on the shaft, a spacer being provided in the first gap to just contact the first drive plate assembly and the first annular bearing, and further comprising a second gap provided between the second drive plate assembly and a second annular bearing provided on the shaft, a second spacer being provided in the second gap to just contact the second drive plate assembly and the second annular bearing.

5. (Currently Amended) The assembly according to claim 4 wherein the spacer is one of a shim, bushing, or spring, or any other similar device.

6. (Original) The assembly according to claim 4 wherein the first annular bearing is located by a first outer race provided in a housing surrounding the assembly, and the first outer race is provided in the housing at a selected position to locate the first annular bearing at a predetermined position that is spaced longitudinally from the first drive plate to form the first gap, and the second annular bearing is located by a second outer race provided in the housing, the second outer race being provided in the housing at a selected position to locate the second annular bearing at a predetermined position that is spaced longitudinally from the second drive plate to form the second gap.

7. (Original) The assembly according to claim 1 wherein a torque transferring assembly is coupled to the shaft, the torque transferring assembly generating a first radial force in a first direction, and the first and second pump/motors are oriented to ensure that when the first and second pump/motors stroke, they each generate a second radial force in a second direction, the second direction being opposite to the first direction.

8. (Original) An assembly comprising:

a first pump/motor having a first drive plate assembly rigidly coupled to and in hard contact with a first end surface of a shaft in a plane perpendicular to a longitudinal axis of the shaft;

a second pump/motor having a second drive plate assembly rigidly coupled to and in hard contact with a second end surface of the shaft in a plane perpendicular to a longitudinal axis of the shaft;

a first annular bearing coupled to the shaft, the first drive plate assembly being in light contact only with the first annular bearing; and

a second annular bearing coupled to the shaft, the second drive plate assembly being in light contact only with the second annular bearing.

9. (Original) The assembly according to claim 8 wherein the first drive plate assembly has a first drive plate, an inner surface of the first drive plate being in hard contact with the first end surface of the shaft, and the second drive plate assembly has a second drive plate, an inner surface of the second drive plate being in hard contact with the second end surface of the shaft.

10. (Original) The assembly according to claim 8 wherein the first drive plate assembly includes a first pump/motor shaft having a first annular surface in a plane perpendicular to the longitudinal axis of the shaft and the second drive plate assembly includes a second pump/motor shaft having a second annular surface in a plane perpendicular to the longitudinal axis of the shaft, and the first and second pump/motor shafts are rigidly connected to the shaft such that the first annular surface is in hard contact with the first end surface of the shaft and the second annular surface is in hard contact with the second end surface of the shaft.

11. (Original) The assembly according to claim 8, further comprising a first gap provided between the first drive plate assembly and the first annular bearing, a first spacer being provided in the first gap to just contact the first drive plate assembly and the first annular

bearing, and further comprising a second gap provided between the second drive plate assembly and the second annular bearing, a second spacer being provided in the second gap to just contact the second drive plate assembly and the second annular bearing.

12. (Currently Amended) The assembly according to claim 11 wherein the spacer is one of a shim, bushing, or spring, or any other similar device.

13. (Original) The assembly according to claim 8 wherein the first annular bearing is located by a first outer race provided in a housing surrounding the assembly, and the first outer race is provided in the housing at a selected position to locate the first annular bearing at a predetermined position that is spaced longitudinally from the first drive plate to form a first gap, and the second annular bearing is located by a second outer race provided in the housing, the second outer race being provided in the housing at a selected position to locate the second annular bearing at a predetermined position that is spaced longitudinally from the second drive plate to form a second gap.

14. (Original) The assembly according to claim 13, further comprising a first spacer provided in the first gap, the first spacer having a thickness sufficient to just bridge the distance between the first drive plate and the first annular bearing, and a second spacer provided in the second gap, the second spacer having a thickness sufficient to just bridge the gap between the second drive plate and the second annular bearing.

15. (Original) The assembly according to claim 8 wherein at least one of the first and the second annular bearings is a tapered bearing, and an axial preload is applied to the tapered bearing.

16. (Original) The assembly according to claim 15 wherein the axial preload is applied by positioning a spring loading device between at least one of the first annular bearing

and the first drive plate assembly or the second annular bearing and the second drive plate assembly.

17. (Withdrawn) The assembly according to claim 15 wherein the axial preload is applied by providing that a size of the first pump/motor is different than a size of the second pump/motor.

18. (Withdrawn) The assembly according to claim 15 wherein the axial preload is applied by stroking one of the first and second pump/motors to a lower displacement angle than the other of the first and second pump/motors.

19. (Original) An assembly comprising:
a first pump/motor and a second pump/motor coupled to a shaft;
a torque transferring device coupled to the shaft between the first and second pump/motors;
a first bearing coupled to the shaft between the first pump/motor and the torque transferring device and a second bearing coupled to the shaft between the second pump/motor and the torque transferring device;
a housing provided around the first and the second pump/motors, the first and the second bearings, and the torque transferring device; and
a first seal positioned between the first bearing and a first drive plate of the first pump/motor and a second seal positioned between the second bearing and a second drive plate of the second pump/motor.

20. (Currently Amended) The apparatus-assembly according to claim 19 wherein the first and the second seals divide the housing into a first, a second, and a third region, the first region containing the first pump/motor, the second region containing the torque transferring device and the first and the second bearings, and the third region containing the second pump/motor.

21. (Currently Amended) The apparatus-assembly according to claim 20 wherein the first and the third regions contain a sufficient volume of oil to operate the first and second pump/motors, and the second region contains a substantially lower volume of oil than in the first and the third regions.

22. (Currently Amended) The apparatus-assembly according to claim 20 wherein the volume of oil in the second region is sufficiently small to only splash lubricate the first and the second bearings.

23. (Original) An assembly comprising:

a first pump/motor and a second pump/motor coupled together via a shaft, and a torque transferring assembly coupled to the shaft, the torque transferring assembly generating a first radial force in a first direction, the first and second pump/motors being oriented to ensure that when the first and second pump/motors stroke, they each generate a second radial force in a second direction, the second direction being opposite to the first direction.

24. (Original) The assembly according to claim 23 wherein the torque transferring assembly includes a plurality of gears that transmit torque from the shaft to a second shaft.

25. (Original) A method of operating a plurality of pump/motors comprising: coupling a first drive plate of a first pump/motor to one side of an input/output shaft;

coupling a second drive plate of a second pump/motor to an opposing side of the input/output shaft;

coupling a torque transferring device to the input/output shaft;

coupling a secondary shaft to the torque transferring device;

generating a separation force in a first direction when transferring torque to the secondary shaft; and

stroking the first pump/motor to generate a first radial force in a second direction and stroking the second pump/motor to generate a second radial force in the second direction, the second direction being opposite to the first direction.

26. (Original) A method for assembling two pump/motors comprising:
 - rigidly coupling a first drive plate of a first pump/motor to a second drive plate of a second pump/motor through one or more shafts;
 - positioning a first bearing adjacent to, yet longitudinally spaced from, the first drive plate to form a first gap;
 - positioning a second bearing adjacent to, yet longitudinally spaced from, the second drive plate to form a second gap;
 - positioning a first spacer in the first gap to just contact the first drive plate and the first bearing; and
 - positioning a second spacer in the second gap to just contact the second drive plate and the second bearing.

27. (Original) A method of improving the efficiency of two or more opposing pump/motors mounted on a common shaft, the method comprising:
 - coupling a first and a second pump/motor on a common shaft;
 - coupling a torque transferring device to the common shaft between the first and second pump/motors;
 - positioning a first bearing between the first pump/motor and the torque transferring device and positioning a second bearing between the second pump/motor and the torque transferring device;
 - housing the first and the second pump/motors, the first and the second bearings, and the torque transferring device in a common housing;
 - dividing the common housing into first, second, and third regions wherein the first and the third regions contain the first and second pump/motors, respectively, and the second region contains the torque transferring device, the first bearing, and the second bearing;

filling the first and the third regions with sufficient oil to operate the pump/motors; and

keeping the second region substantially sealed from the oil contained in the first and the third regions.

28.-40. (Cancelled)

41. (New) The assembly of claim 1 wherein the first and second pump/motors are bent-axis pump/motors.

42. (New) The assembly of claim 1, comprising an actuator mechanism coupled to the first and second pump/motors and configured to control displacement changes of each of the first and second pump/motors such that the displacement of each of the first and second pump/motors remains substantially equal to each other.

43. (New) The assembly of claim 42 wherein the actuator mechanism comprises first and second actuators coupled to the first and second pump/motors, respectively.